

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-23-05

Assessing Novel Biosources for Human Performance Monitoring

PROJECT DESCRIPTION: Real-time non-invasive monitoring of human performance is becoming mainstream due to frequent use of wearable fitness trackers by the general population. While these devices monitor basic measurements, such as heart rate, the need for additional information, from novel sources, is necessary. As such, the US Air Force has made a significant investment in the determination of novel biomarkers from non-invasive sources, like exhaled breath. However, the need to further investigate new alternative biosources for human performance monitoring is required to fulfill AF mission requirements. In this project, we will utilize high end mass spectrometry and complementary analytical techniques to evaluate novel biosources, such as tears or exhaled breath condensate, within a controlled laboratory environment. Therefore, we are looking for a student that has a strong background in chemistry, biology, or engineering to contribute to this project.

ACADEMIC LEVEL: Bachelor's, Master's, PhD

DISCIPLINE NEEDED:

- Biochemistry
- Chemistry
- Biology

RESEARCH LOCATION: Wright-Patterson Air Force Base, Dayton, Ohio

RESEARCH MENTOR: Sean Harshman, PhD
Cancer Biology/Immunology, Ohio State University, 2013



I am a chemist/biologist with more than 7 years working at AFRL on human performance-based research projects. My areas of expertise involve collection and analysis of human based biosources, such as exhaled breath, sweat, saliva, urine, etc., for predicting human performance. This involves techniques like liquid chromatography, gas chromatography, mass spectrometry, and bioinformatics. My principal area of research is determining biomarkers of Air Force scenarios, such as hypoxia and fatigue. I am currently the technical lead for the analytical chemistry group of the Air Force Research Laboratory where I am responsible for proper operation, maintenance, and funded research utilizing more than 7 million dollars in mass spectrometry equipment housed within the 711th Human Performance Wing. *Photo courtesy of the U.S. Air Force Research Laboratory.*